Programmable Temperature Controller
DTC-P Series User Manual

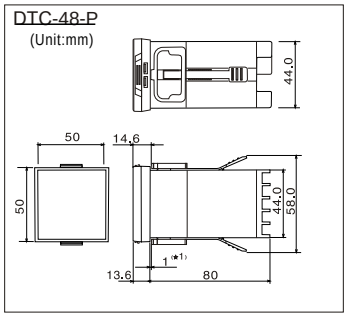
Please read this manual carefully and keep this manual for future use

General Specifications

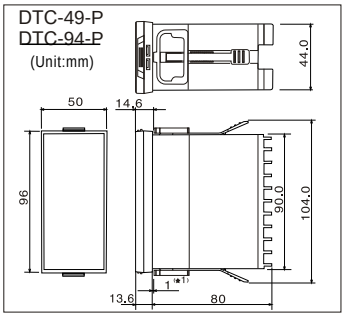
- DTC-P series programmable temperature controller, 4 digits LED display, with bar graphic display, 0.2% accuracy, 0.1 resolution for thermocouple and Pt100 input signal, 0.001 resolution for analong input signal, auto/manual control bumpless transfer
- Maximum 4 different programs, each program with 8 segments, 4 program can be linked together as 1 program with 32 segments
- Maximum output power is configurable for each segment
- System time unit is switchable bewtee hour, minute and second
- Easy monitoring on current runing segment and program excution time period The
- program can start from process value or from 0
- The program can be triggered or terminated by front key or start running automatically
- after power on and controller has the power failure restore function When program finished, controller can repeat the preset program again or stop operating completely
- Guaranteed soak function
-
- segment ending alarm», program ending alarm, program running alarm segment ending alarm delay function
- RS-485 optional, master/slave communicaiton mode optional
- Please make sure the wiring is correct before power on, the wiring diagram is on the size of the controller for easy reference duing the wiring, make sure you are clear on the output type whether it is Relay, SSR drive or 4-20mA
- Controller can switch freely between thermocouple or RTD input signals for analog inputs, need to specify before order
- The factory default control action is OUT1 for reverse control(heating) customer can set OUT1 as direct control(cooling)
- Factory default control mode is P.I.D mode
- When I=0,d=0, the control mode set as time proportional mode,proportaional value is rSt1, control cycle is Cyt1, the output decrease when rSt1 decrease under heating mode the output increase when rSt1 decrease under cooling control mode

1: Dimensions

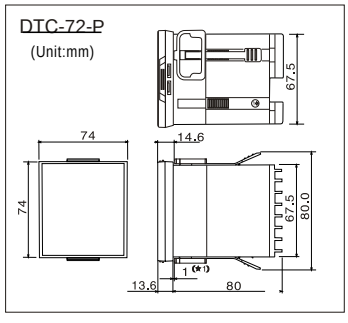
DTC-48-P
(Unit:mm)



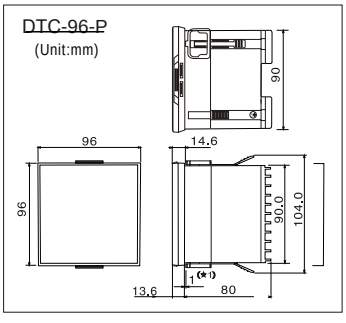
DTC-49-P
DTC-94-P
(Unit:mm)



DTC-72-P
(Unit:mm)



DTC-96-P
(Unit:mm)



2: Ordering informaiton

DTC □P□□□□□□□

1 2 3 4 5 6 7 8

1:Size Information

- **48**: 48mm(Width)*48mm(Height)
- **49**: 48mm(Width)*96mm(Height)
- **72**: 72mm(Width)*72mm(Height)
- **96**: 96mm(Width)*96mm(Height)
- **94**: 96mm(Width)*48mm(Height)

2:Version Code

- **P:** Programmable temperature controller also known as Ramp and soak controller

3:Output

- **R**: Relay
- **V**: SSR drive
- **D**: 4-20mA
- **2**: 0-20mA
- **5**: 0-5VDC
- **6**: 0-10VDC
- **7**: 1-5VDC

4:Alarm options

- **1:** 1 alarm
- **2**: 2 alarms
- **3**: 3 alarms

5:Power supply

- **96:** 85~265VAC

6:Re-transmission

- **N:** Without re-transmission
- **P42:** PV re-transmission as 4-20mA
- **P005:** PV re-transmission as 0-5VDC
- **P010:** PV re-transmission as 0-10VDC
- **S42:** SV re-transmission as 4-20mA
- **S005:** SV re-transmission as 0-5VDC
- **S010:** SV re-transmission as 0-10VDC

7:Communication

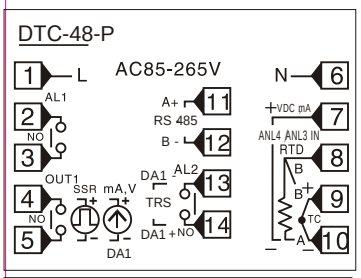
- **N:** Without communication
- **K:** RS-485 Modbus RTU

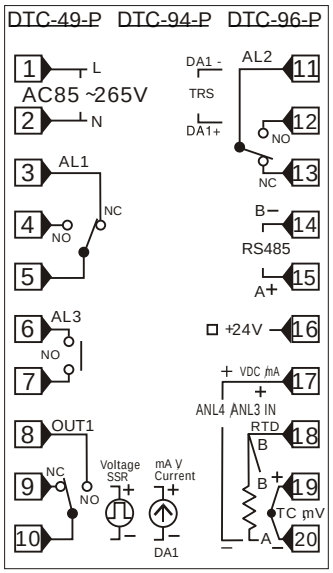
8:Auxiliary Power supply

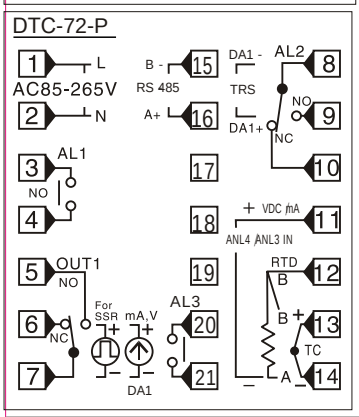
- **N:** Without auxiliary power supply
- **24**: 24VDC

Remark: not all options are available at the same time. some of function share the same terminals , so various functions may create conflicts with each other, consult our sales team before order

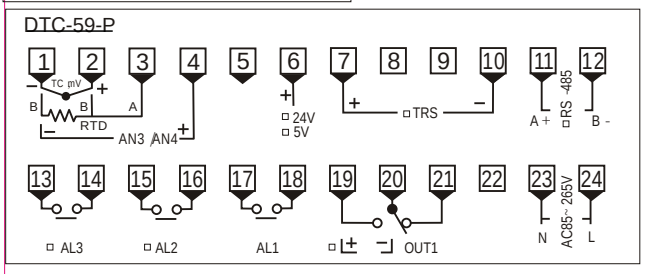
3: Wiring diagram





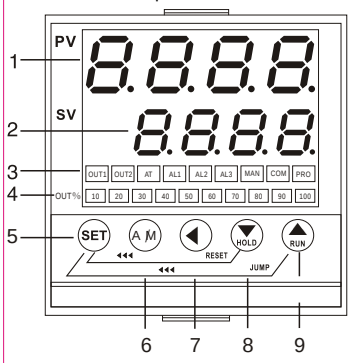


Remark:
The wiring diagram is for standard products please refer to the wiring diagram on the unit during field installation refer to wiring diagram on the unit for SCR output type



4: Panel discription

4.1 Panel discription



1 PV,indicate process value
2 SV,indicate setting value
3 OUT 1: Output 1 indicator
OUT2: Output 2 indicator
AT: Auto-tuning indicator
Al1: Alarm 1 indicator
AL2:Alarm 2 indicator
Al3: Alarm 3 indicator
Man: manual control indicator
COM: communication indicator
PRG: Programm excecution indicator
4 Bar Graphic display
5 SET key
6 A/M, auto/manual control switch key
7 ◀ : Shift key(function key)
8 ▼ : Decrease, program pause key
9 ▲ : Increase, program active key

4.2 Operation key description

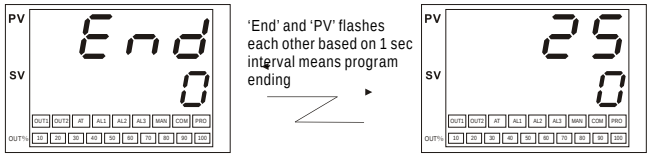
Program active(RUN): Press increase key for 3 second to active the program check PRO indicator, when it is flashing, prgram activated confirmed

Program pause(HOLD): Press decrease/HOLD key for more than 3 seconds during program is runningto put the program on hold status,PRO indicator stop flahsing and keep lighting

Program jumping(JUMP): Press increse/Run key and SET key at the same time during the program is running, the program goes to next segment(Jump to next segment)

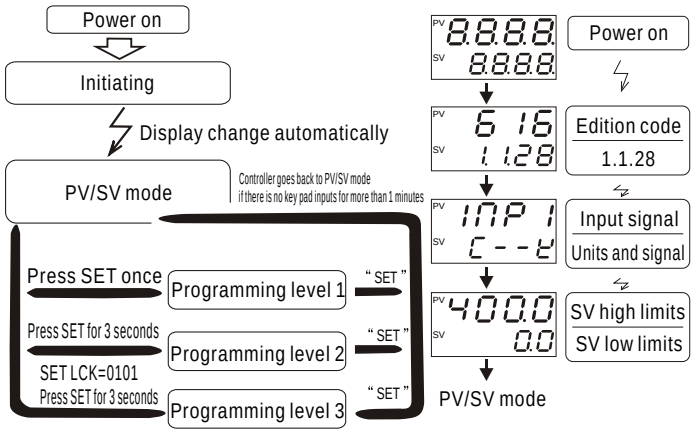
Program reset(RESET): Press decrease key and SET key at the same time, the program reset and PRO indicator went black out

4.3 Status when program ends



5. SETTING

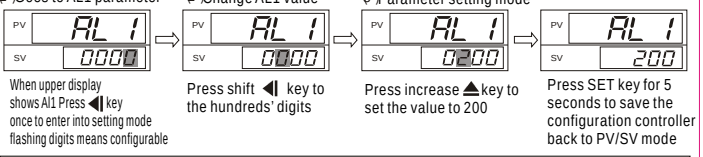
5 1 Goes to different programming level



Symbol	0 1	0 2	E 1	E 2	J 1	J 2	n	u
Input signal	K	K	E	E	J	J	N	Wu3 _Re25
Range	400 0 ℃	1300 ℃	300 0 ℃	600 ℃	400 0 ℃	800 ℃	1300 ℃	2000 ℃

Symbol	S	t	r	b	AN4	AN3	AN2	AN1	Pt1	Pt2
Input signal	S	T	R	B	2 -10VDC 1 -5VDC 4 -20mA	0 -10VDC 0 -5VDC 0 -20mA	0 -50mV	0 -20mV	Pt100	Pt100
Range	1600 ℃	400 0 ℃	1700 ℃	1800 ℃					-199 9~ 200 0℃	-200~ 800℃

5 2 Change AL1 value For example, change AL1 from 0 to 200°C


①)Goes to AL1 parameter
②)Change AL1 value
③)Parameter setting mode
When upper display shows Al1 Press ◀ key once to enter into setting mode flashing digits means configurable
Press shift ◀ key to the hundreds' digits
Press increase ▲ key to set the value to 200
Press SET key for 5 seconds to save the configuration controller back to PV/SV mode

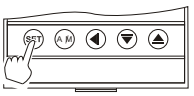
Remark
* Press decrease or increase once the value will increase or decrease by 1
the value will decrease or increase continuously if keep pressing up or down key
A/M key can be used to save the configuration made to different parameters
* Press once can save the modification and exit from the menu
* Press SET key for more than 3 seconds can save and exit from parameter menu no matter where you are

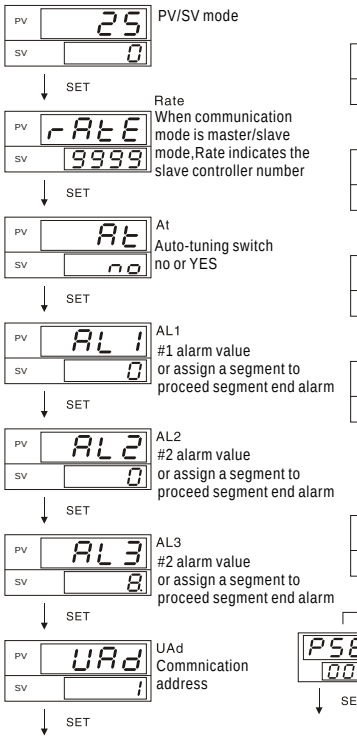
6 Programming Level

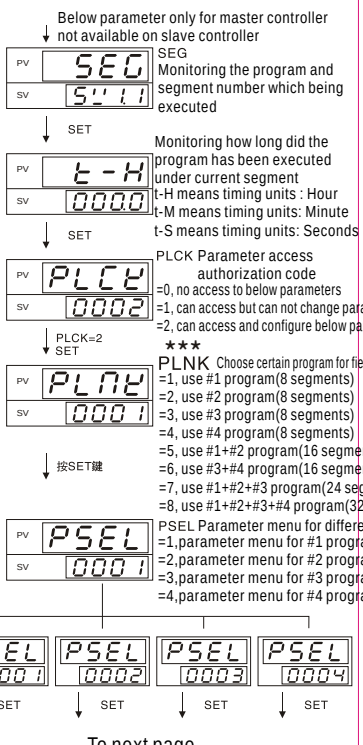
6 1 Programming level 1

6 1 1 General parameter under programming level 1

Press SET once to goes to programming level 1






Below parameter only for master controller not available on slave controller
SEG
Monitoring the program and segment number which being executed
Monitoring how long did the program has been executed under current segment
t-H means timing units : Hour
t-M means timing units: Minute
t-S means timing units: Seconds
PLCK Parameter access authorization code
=0, no access to below parameters
=1, can access but can not change parameter value
=2, can access and configure below parameters
PLCK=2
★★★
PLNK Choose certain program for field application
=1, use #1 program(8 segments)
=2, use #2 program(8 segments)
=3, use #3 program(8 segments)
=4, use #4 program(8 segments)
=5, use #1+#2 program(16 segments)
=6, use #3+#4 program(16 segments)
=7, use #1+#2+#3 program(24 segments)
=8, use #1+#2+#3+#4 program(32 segments)
按SET键
PSEL Parameter menu for different program
=1,parameter menu for #1 program
=2,parameter menu for #2 program
=3,parameter menu for #3 program
=4,parameter menu for #4 program

To next page

From previous page

PV PSEL / SV 0001 — PSEL=1 Access to parameter menu for #1 program

SET

PV SV1.1 / SV — SV1.1 SV for #1 segment of #1 program

SET

PV Tr1.1 / SV — Tr1.1 Time for #1 segment of #1 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot1.1 / SV — Ot1.1 Maximum output ratio for #1 segment of #1 program 0.0-100.0%

SET

PV SV1.2 / SV — SV1.2 SV for #2 segment of #1 program

SET

PV Tr1.2 / SV — Tr1.2 Time for #2 segment of #1 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot1.2 / SV — Ot1.2 Maximum output ratio for #2 segment of #1 program 0.0-100.0%

SET

PV SV1.3 / SV — SV1.3 SV for #3 segment of #1 program

SET

PV Tr1.3 / SV — Tr1.3 Time for #3 segment of #1 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot1.3 / SV — Ot1.3 Maximum output ratio for #3 segment of #1 program 0.0-100.0%

SET

PV SV1.4 / SV — SV1.4 SV for #4 segment of #1 program

SET

PV Tr1.4 / SV — Tr1.4 Time for #4 segment of #1 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot1.4 / SV — Ot1.4 Maximum output ratio for #4 segment of #1 program 0.0-100.0%

SET

PV SV1.5 / SV — SV1.5 SV for #5 segment of #1 program

SET

PV Tr1.5 / SV — Tr1.5 Time for #5 segment of #1 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot1.5 / SV — Ot1.5 Maximum output ratio for #5 segment of #1 program 0.0-100.0%

SET

PV SV1.6 / SV — SV1.6 SV for #6 segment of #1 program

SET

PV Tr1.6 / SV — Tr1.6 Time for #6 segment of #1 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot1.6 / SV — Ot1.6 Maximum output ratio for #6 segment of #1 program 0.0-100.0%

SET

PV SV1.7 / SV — SV1.7 SV for #7 segment of #1 program

SET

PV Tr1.7 / SV — Tr1.7 Time for #7 segment of #1 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot1.7 / SV — Ot1.7 Maximum output ratio for #7 segment of #1 program 0.0-100.0%

SET

PV SV1.8 / SV — SV1.8 SV for #8 segment of #1 program

SET

PV Tr1.8 / SV — Tr1.8 Time for #8 segment of #1 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot1.8 / SV — Ot1.8 Maximum output ratio for #8 segment of #1 program 0.0-100.0%

SET

PV 25 / SV 0 — PV/SV mode

PV PSEL / SV 0002 — PSEL=2 Access to parameter menu for #2 program

SET

PV SV2.1 / SV — SV2.1 SV for #1 segment of #2 program

SET

PV Tr2.1 / SV — Tr2.1 Time for #1 segment of #2 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot2.1 / SV — Ot2.1 Maximum output ratio for #1 segment of #2 program 0.0-100.0%

SET

PV SV2.2 / SV — SV2.2 SV for #2 segment of #2 program

SET

PV Tr2.2 / SV — Tr2.2 Time for #2 segment of #2 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot2.2 / SV — Ot2.2 Maximum output ratio for #2 segment of #2 program 0.0-100.0%

SET

PV SV2.3 / SV — SV2.3 SV for #3 segment of #2 program

SET

PV Tr2.3 / SV — Tr2.3 Time for #3 segment of #2 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot2.3 / SV — Ot2.3 Maximum output ratio for #3 segment of #2 program 0.0-100.0%

SET

PV SV2.4 / SV — SV2.4 SV for #4 segment of #2 program

SET

PV Tr2.4 / SV — Tr2.4 Time for #4 segment of #2 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot2.4 / SV — Ot2.4 Maximum output ratio for #4 segment of #2 program 0.0-100.0%

SET

PV SV2.5 / SV — SV2.5 SV for #5 segment of #2 program

SET

PV Tr2.5 / SV — Tr2.5 Time for #5 segment of #2 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot2.5 / SV — Ot2.5 Maximum output ratio for #5 segment of #2 program 0.0-100.0%

SET

PV SV2.6 / SV — SV2.6 SV for #6 segment of #2 program

SET

PV Tr2.6 / SV — Tr2.6 Time for #6 segment of #2 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot2.6 / SV — Ot2.6 Maximum output ratio for #6 segment of #2 program 0.0-100.0%

SET

PV SV2.7 / SV — SV2.7 SV for #7 segment of #2 program

SET

PV Tr2.7 / SV — Tr2.7 Time for #7 segment of #2 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot2.7 / SV — Ot2.7 Maximum output ratio for #7 segment of #2 program 0.0-100.0%

SET

PV SV2.8 / SV — SV2.8 SV for #8 segment of #2 program

SET

PV Tr2.8 / SV — Tr2.8 Time for #8 segment of #2 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot2.8 / SV — Ot2.8 Maximum output ratio for #8 segment of #2 program 0.0-100.0%

SET

PV 25 / SV 0 — PV/SV mode

PV PSEL / SV 0003 — PSEL=3 Access to parameter menu for #3 program

SET

PV SV3.1 / SV — SV3.1 SV for #1 segment of #3 program

SET

PV Tr3.1 / SV — Tr3.1 Time for #1 segment of #3 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot3.1 / SV — Ot3.1 Maximum output ratio for #1 segment of #3 program 0.0-100.0%

SET

PV SV3.2 / SV — SV3.2 SV for #2 segment of #3 program

SET

PV Tr3.2 / SV — Tr3.2 Time for #2 segment of #3 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot3.2 / SV — Ot3.2 Maximum output ratio for #2 segment of #3 program 0.0-100.0%

SET

PV SV3.3 / SV — SV3.3 SV for #3 segment of #3 program

SET

PV Tr3.3 / SV — Tr3.3 Time for #3 segment of #3 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot3.3 / SV — Ot3.3 Maximum output ratio for #3 segment of #3 program 0.0-100.0%

SET

PV SV3.4 / SV — SV3.4 SV for #4 segment of #3 program

SET

PV Tr3.4 / SV — Tr3.4 Time for #4 segment of #3 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot3.4 / SV — Ot3.4 Maximum output ratio for #4 segment of #3 program 0.0-100.0%

SET

PV SV3.5 / SV — SV3.5 SV for #5 segment of #3 program

SET

PV Tr3.5 / SV — Tr3.5 Time for #5 segment of #3 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot3.5 / SV — Ot3.5 Maximum output ratio for #5 segment of #3 program 0.0-100.0%

SET

PV SV3.6 / SV — SV3.6 SV for #6 segment of #3 program

SET

PV Tr3.6 / SV — Tr3.6 Time for #6 segment of #3 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot3.6 / SV — Ot3.6 Maximum output ratio for #6 segment of #3 program 0.0-100.0%

SET

PV SV3.7 / SV — SV3.7 SV for #7 segment of #3 program

SET

PV Tr3.7 / SV — Tr3.7 Time for #7 segment of #3 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot3.7 / SV — Ot3.7 Maximum output ratio for #7 segment of #3 program 0.0-100.0%

SET

PV SV3.8 / SV — SV3.8 SV for #8 segment of #3 program

SET

PV Tr3.8 / SV — Tr3.8 Time for #8 segment of #3 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot3.8 / SV — Ot3.8 Maximum output ratio for #8 segment of #3 program 0.0-100.0%

SET

PV 25 / SV 0 — PV/SV mode

PV PSEL / SV 0004 — PSEL=4 Access to parameter menu for #4 program

SET

PV SV4.1 / SV — SV4.1 SV for #1 segment of #4 program

SET

PV Tr4.1 / SV — Tr4.1 Time for #1 segment of #4 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot4.1 / SV — Ot4.1 Maximum output ratio for #1 segment of #4 program 0.0-100.0%

SET

PV SV4.2 / SV — SV4.2 SV for #2 segment of #4 program

SET

PV Tr4.2 / SV — Tr4.2 Time for #2 segment of #4 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot4.2 / SV — Ot4.2 Maximum output ratio for #2 segment of #4 program 0.0-100.0%

SET

PV SV4.3 / SV — SV4.3 SV for #3 segment of #4 program

SET

PV Tr4.3 / SV — Tr4.3 Time for #3 segment of #4 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot4.3 / SV — Ot4.3 Maximum output ratio for #3 segment of #4 program 0.0-100.0%

SET

PV SV4.4 / SV — SV4.4 SV for #4 segment of #4 program

SET

PV Tr4.4 / SV — Tr4.4 Time for #4 segment of #4 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot4.4 / SV — Ot4.4 Maximum output ratio for #4 segment of #4 program 0.0-100.0%

SET

PV SV4.5 / SV — SV4.5 SV for #5 segment of #4 program

SET

PV Tr4.5 / SV — Tr4.5 Time for #5 segment of #4 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot4.5 / SV — Ot4.5 Maximum output ratio for #5 segment of #4 program 0.0-100.0%

SET

PV SV4.6 / SV — SV4.6 SV for #6 segment of #4 program

SET

PV Tr4.6 / SV — Tr4.6 Time for #6 segment of #4 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot4.6 / SV — Ot4.6 Maximum output ratio for #6 segment of #4 program 0.0-100.0%

SET

PV SV4.7 / SV — SV4.7 SV for #7 segment of #4 program

SET

PV Tr4.7 / SV — Tr4.7 Time for #7 segment of #4 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot4.7 / SV — Ot4.7 Maximum output ratio for #7 segment of #4 program 0.0-100.0%

SET

PV SV4.8 / SV — SV4.8 SV for #8 segment of #4 program

SET

PV Tr4.8 / SV — Tr4.8 Time for #8 segment of #4 program 0.0-999.9 hours or minutes 0-9999 seconds

SET

PV Ot4.8 / SV — Ot4.8 Maximum output ratio for #8 segment of #4 program 0.0-100.0%

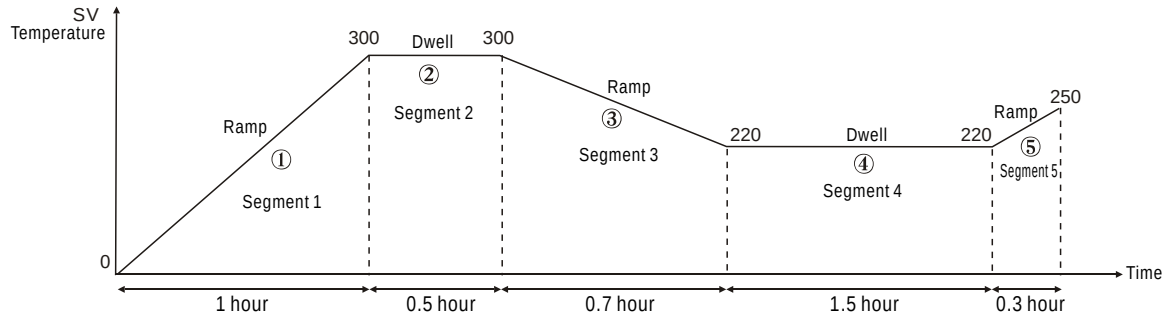
SET

PV 25 / SV 0 — PV/SV mode

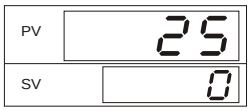
This controller can have maximum 4 programs, and user can choose to run certain program
different programs can be linked together using PLNK parameter, linked program with 16,24, or 32 segments

6 2 Typical application

Suppose we need a program with 5 segments, using #1 program for the application, check below curve, the maximum output ratio restricted to 80% at segment 4 to avoid damage.
system timing unit: hours



How to create a program like above figure



PV/SV mode

Press SET until you see PLCK

SET PLCK=2 to access to program configuration menu

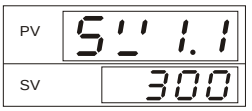
SET →

SET PLNK=1 to use the #1 program for the application

SET →

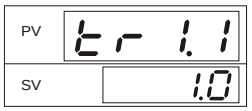
SET PSEL=1 goes to parameter menu for #1 program

SET →



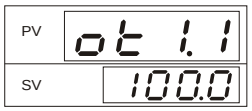
Set the SV for #1 segment at 300C

SET



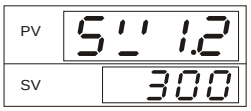
Set the ramp time for #1 segment at 1 hour

SET →



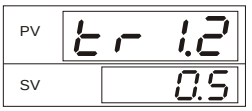
Maximum output for #1 segment is 100%

SET →



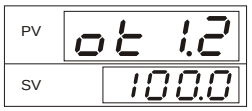
Set the SV for #2 segment at 300

SET →



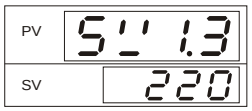
Dwell time for #2 segment at 0.5 hour

SET



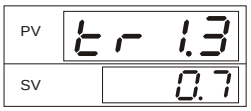
Maximum output for #2 segment is 100%

SET →



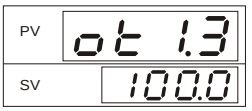
Set the SV for #3 segment at 220 C

SET →



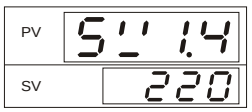
Ramp time for #3 segment is 0.7 hour

SET →



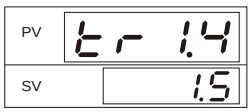
Maximum output for #3 segment is 100%

SET



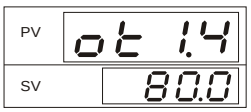
Set the SV for #4 segment at 220 C

SET →



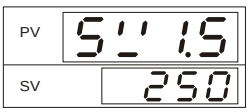
Dwell time for #4 segment at 1.5 hour

SET →



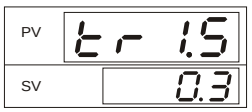
Maximum output for #4 segment is 80%

SET →



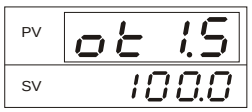
Set the SV for #5 segment at 250 C

SET



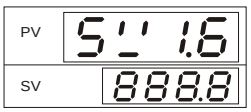
Ramp time for #5 segment is 0.3 hour

SET →



Maximum output for #5 segment is 100%

SET →

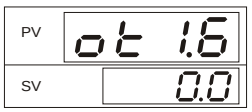


SET SV as any random value for #6 segment

SET →

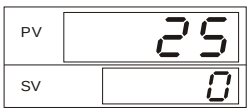
SET any random value for time of #6 segment

SET



SET maximum output as 0.0% for #6 segment

Press SET key for 3 seconds or light press A/M key to save the configuration and exit from the programing menu →



PV/SV mode

6 3 Program automatically terminated

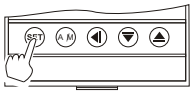
SET the maximum output menu as 0.0% at certain segment if a program less than 8 segments and program ending when it comes to the last segment. in above case, the program only have 5 segments, then set the maximum output for #6 segment as 0.0%, program ends after 5 segments.

6 4 Program automatically jumping

If a program needs to skip on certain segments, set the segment time as 0.0, when program runs to the segment where the time has been set as 0.0, it will go to next segment automatically, for example, in a program where we want to skip on segment 4, then SET the time for segment 4 as “0.0", then program automatically goes to segment 5 from segment 3.

6 2 Programming level 2

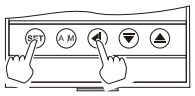
Refer to right figure, press SET key for 3 seconds to enter into programming level 2, below parameter shows one by one on the fixed sequence



Parameter Notation	Parameter description	Range	Default value	Remark
P1	Proportional band for out1	0 0 ~200 0	20 0	Proportional band for output 1(SEP P=3.0 for analog input signal) unit is degree, when P1=0, controller works as ON/OFF controller
I1	Integral time for out 1	0-3600 Sec	210	Integral time for output 1, when I1=0, integral action disabled integral action gets more sensitive when I1 gets bigger, but fluctation is more expected
d1	Derivative time for out 1	0-3600 Sec	30	Derivative time for out 1, when d1=0, the derivative action disabled derivative action gets more sensitive when d1gets bigger, but fluctation is more expected
AtuL	Auto tuning offset value(AtVL)	0-199 C	0	Set ATVL to prevent overshoot occurred during autotuning process.
CYt 1	Control cycle time for out 1	0 to 999 Sec	20	Control cycle time for out 1 Set as 20 S for relay output, 2 S for SSR drive output
HYS 1	Control Hysteresis For out1	0 0 to 100 0	2 0	When P1=0.0, OUT1 is on/off control In heating application PV >SV OUT1 terminated PV<SV-HYS1 OUT1 activated In cooling application: PV>SV+HYS1 OUT1 activated PV<SV OUT1 terminated
rSt 1	Proportional reset For out1	30 to 30	5 0	Proportional reset for overshoot protection only for out1 output.(Auto set after auto-tuning)
OPL	Output lower limit	0 0 to 100 0%	0 0	To set the output lower limit for out 1
OPH	Output higher limit	0 0 to 100 0%	100 0	To set the output higher limit for out 1
LCY	Access protection parameter	0000 0255	0	LCK=0000: all parameters are configurable LCK=0001: only SV value configurable LCK=0010: configurable on SV and parameters under programming level 1 LCK=0011: can not configure all parameters LCK=0101:all parameters are configurable, accessible to programming level 3 LCK=0201:all parameters are configurable, accessible to programming level 4

6 3 Programming level 3

6 3 1 How to access to programming level 3



1. Refer to 6.2 instruction and goes to programming level 2, SET LCK=0101 and press SET for 3 seconds to exit to PV/SV mode
2. Refer to figure at right, Press SET and shift key at the same time for 3 seconds to access to programming level 3 below parameters will show one by one based on below sequence

Parameter Notation	Parameter description	Range	Default value	Remark
InP 1	Input signal selection			

Input signal notation	U1	U2	E1	E2	J1	J2	n	u
Description	K	K	E	E	J	J	N	Wu3 _Re25
Range	400 0 ℃	1300 ℃	300 0 ℃	600 ℃	400 0 ℃	800 ℃	1300 ℃	2000 ℃

Input signal notation	S	t	r	b	AN4	AN3	AN2	AN1	Pt1	Pt2
Description	S	T	R	B	2 -10VDC 1 -5VDC 4 -20mA	0 -10VDC 0 -5VDC 0 -20mA	0 -50mV	0 -20mV	Pt100	Pt100
Range	1600 ℃	400 0 ℃	1700 ℃	1800 ℃					-199 9~ 200 0℃	-200~ 800℃

Remark 1: User can select thermocouple or Pt100 via front key
Remark 2: Analog input has to be specified before order except 0-20mV and 0-50mV

dP	Decimal point for analog input	0 1 2 3	0	0: No decimal point 1: 1 decimal point 2: 2 decimal point 3: 3 decimal point only applicable for analog input
LSPL	SV lower limit	-1999 to 9999	0	Setting value lower limit Or to define the lower limit temperature for Re-transmission function
USPL	SV higher limit	-1999 to 9999	400	Setting value higher limit Or to define the higher limit temperature for Re-transmission function
Unit	Display unit	0 1 2	0	0: Celcius 1: Fahrenheit 2: Without Unit
PvOS	PV Bias value	199 to 199	0 0	To compensate the measuring error from the sensors
PvFt	Sampling rate	0 to 30	25	When value gets smaller, the response to the sensor is more sensitive but can expect some fluctuation, when value gets bigger, it will have reverse effects
ANL 1	Analog input lower limit display value	-199~9999	0	For example, the display value is ANL1 when input is 4mA for 4-20mA range
ANH 1	Analog input higher limit display value	-1999~9999	2000	For example, the display value is ANH1 when input is 20mA for 4-20mA range
ALd 1	Alarm mode for #1 alarm	00 to 18	11	To define the alarm mode for #1 alarm refer to alarm mode figure for alarm mode description
AH 1	Alarm hysteresis for #1 alarm	0 0 to 100 0	1 0	Alarm hysteresis value for #1 alarm High alarm(lower side hysteresis) Low alarm(higher side hysteresis)
ALd2	Alarm mode for #2 alarm	00 to 18	10	To define the alarm mode for #2 alarm refer to alarm mode figure for alarm mode description
AH2	Alarm hysteresis for #2 alarm	0 0 to 100 0	1 0	Alarm hysteresis value for #2 alarm High alarm(lower side hysteresis) Low alarm(higher side hysteresis)
ALd3	Alarm mode for #3 alarm	00 to 18	10	To define the alarm mode for #3 alarm refer to alarm mode figure for alarm mode description
AH3	Alarm hysteresis for #3 alarm	0 0 to 100 0	1 0	Alarm hysteresis value for #3 alarm High alarm(lower side hysteresis) Low alarm(higher side hysteresis)
OUd	Control action	0 or 1	0	0:Reverse control(heating) 1:Direct control(cooling)
ALt	ALt Program ending alarm delay time	0 9999 Seconds	0	0 When value=0, the alarm output right after program end Other value from 1-9999 seconds Program end alarm output delay certain (from 1-9999 seconds) then output
JA it	Wait	0 0 100 0 Celcius		0:Disable program holding function Other value: temperature range to active the program holding function
PUnt	PUNt System time units	0 1 2	0	0: Hour (0.0~999.9 Hour) 1: Minutes(0.0~999.9 Minutes) 2: Second(0-9999 Seconds)

Parameter Notation	Parameter description	Range	Default value	Remark
PrF	PrF Temperature where the program starts to run	0 1	1	0: Program starts to run from 0 1: Program starts to run from process value
Idn0	Communication address	0 127	1	To configure the address of controller in communication mode
bAUd	Communication rate	0 1 2 3	2	bAUd=0 Rate=2.4K bAUd=2 Rate=9.6K bAUd=1 Rate=4.8K bAUd=3 Rate=19.2K

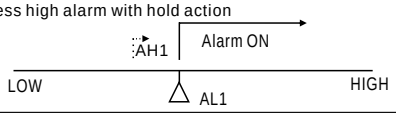
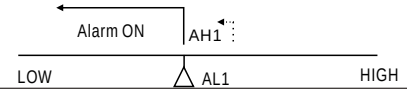
* Alarm mode(ALd=00~18)

10: No alarm output
11: Deviation high alarm
12: Deviation low alarm
13: Deviation high/low alarm
14: Deviation band alarm
15: Process high alarm
16: Process low alarm
17: Program execution alarm
18:Program ending alarm

00: No alarm output
01: Deviation high alarm with alarm standby funciton
02: Deviation low alarm with alarm standby function
03: Deviation high/low alarm with alarm standby function
04: Deviation band alarm with alarm standby function
05: Process high alarm with alarm standby function
06: Process low alarm with alarm standby function
07: Segment ending alarm

6 3 2 Alarm mode specification

Code	ALD	Specification(Example for alarm 1)
N	10 or 00	No alarm
A	11	AL1 ≥ 0: Deviation high alarm — AH1, Alarm ON, LOW, SV, SV+AL1, HIGH AL1<0: Deviation high alarm — AH1, Alarm ON, LOW, SV+AL1, SV, HIGH
B	12	AL1 ≥ 0: Deviation low alarm — Alarm ON, AH1, LOW, SV, SV+AL1, HIGH AL1<0: Deviation low alarm — Alarm ON, AH1, LOW, SV+AL1, SV, HIGH
C	13	Deviation high/low alarm — Alarm ON, AH1, AH1, Alarm ON, LOW, SV - AL1, SV, SV+AL1, HIGH
D	14	Deviation band alarm — Alarm ON, LOW, SV - AL1, SV, SV+AL1, HIGH
H	15	Process high alarm — AH1, Alarm ON, LOW, AL1, HIGH
J	16	Process low alarm — Alarm ON, AH1, LOW, AL1, HIGH
E	01	AL1 ≥ 0: Deviation high alarm with hold action — AH1, Alarm ON, LOW, SV, SV+AL1, HIGH AL1<0: Deviation high alarm with hold action — AH1, Alarm ON, LOW, SV+AL1, SV, HIGH
F	02	AL1 ≥ 0: Deviation low alarm with hold action — Alarm ON, AH1, LOW, SV, SV+AL1, HIGH AL1<0: Deviation low alarm with hold action — Alarm ON, AH1, LOW, SV+AL1, SV, HIGH
G	03	Deviation high/low alarm with hold action — Alarm ON, AH1, AH1, Alarm ON, LOW, SV - AL1, SV, SV+AL1, HIGH
M	04	Deviation band alarm with hold action — Alarm ON, LOW, SV - AL1, SV, SV+AL1, HIGH

Code	ALd□	Specification(Take alarm 1 as example)
K	05	Process high alarm with hold action 
L	06	Process low alarm with hold action 
2	07	Segment ending alarm
3	17	Program execution alarm
4	18	Program ending alarm

Remark: “Alarm standby” function means if the alarm condition meets while controller just power on the alarm will not output, when temperature goes out to the alarm range and falls back to alarm range again, the alarm will output
Alarm mode apply to all three alarms, alarm 1, alarm 2 and alarm 3.

6.3.3 Various alarm for program control

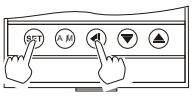
Segment ending alarm: When ALd=07, the alarm is defined as segment ends alarm
AL(AL1 ,AL2, Al3) value means when program comes to the certain segment, the alarm will output

For example, When ALd1=07, AL1=2(or 0.2), means when program finish segment 2. the alarm will go off and remind operator that the segment 2 is finished.

Program ending alarm, When ALd01=17, the alarm is defined as program ends alarm,
When program ends, the alarm will go off.

Program execution alarm, When ALd01=18, the alarm will go off when program starts

6 4 Programming level 4



6 4 1 How to access to programming level 4

1. Follow instruction in 6.2 to goes to programming level 2, change LCK value to 0201 then press SET key for 3 seconds to save the change
2. Refer to image at right, Press SET and ◀ at the same time for 3 seconds to goes to programming level 4, below parameter will display one by one

Parameter Notation	Parameter description	Range	Factory default	Remark
ConF	ConF Communication function setting	0 1 2	0	ConF =0: Turn off communication ConF =1: Turn on communication ConF =2: Turn on Master/Slave communication mode
trSF	TrSF Re-transmission setting	0, 1	0	TrSF=0: Re-transmission on the process value trSF=1: Re-transmission on the setting value
PCrL	PCrL Master/Slave communication mode configuration	0, 1	1	PCrL=0: Define controller as slave controller PCrL=1: Define controller as master controller
ot1	Ot1 Analog output configuration	0, 1	0	Ot1=0: Define analog output as re-transmission output Ot1=1: Define analog output as PID control output
AUtO	AUtO Auto/manual control configuration	0 , 1	0	AUTO =0 : Disable auto/manual switch AUTO =1 : Enable auto/manual switch
PrON	PrON How programs starts to run after power on and after power failure	0, 1, 2	0	PrON=0: Program resets right after power on, press start key to active the program manually. PrON=1: Program starts to run at the point before power cut off(apply in power failure situation) PrON=2: Program resets right after power on then runs the program automatically
PrEP	PrEP Program repeat mode configuration	0, 1	0	PrEP =0 : Program doesn’t repeat after program ends PrEP =1: Program repeat from segment 1 after one complete circle

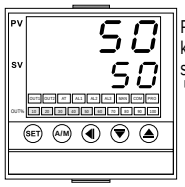
7: Panel discription

Manual control works only after the program starts to run

All controllers except 48mm*48mm with auto/manual (A/M) transfer key

Example: Following is an example of manual setting to 70% output.

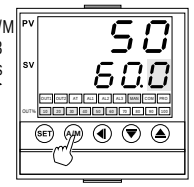
Auto control mode



MAN lamp is turns off in Auto control mode.

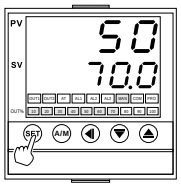
Press A/M key for 3 seconds

Manual setting mode



Press A/M key for 3 seconds to manual setting mode. In manual setting mode, MAN lamp light up,The digit which flashing is settable.

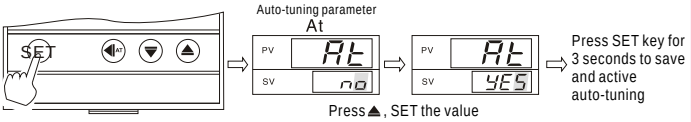
Manual control mode



Pressing the UP key increase numerals, and pressing the DOWN key decrease numerals. Press SET key after set value to 70.0.

**In manual control mode ,press A/M key for 3 seconds to auto control mode.
**Power-on Manual function can be selected. Pko in level2 for initial output value.
**A/M key can also be used for SAVE and EXIT key.

8 AUTO-TUNING

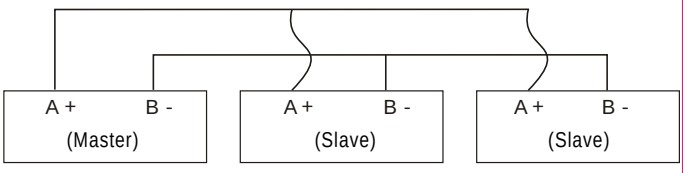


Master controller: the SV value for the auto-tuning process is the SV for the first segment

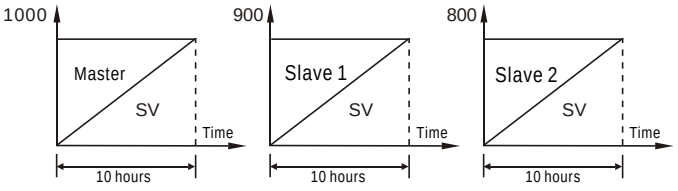
Slave controller: the auto-tuning for the slave controller must be activated after the master controller, the setting value is related to master controller

9 Master and Slave Communication Mode

9 1 Master controller: Act as master controller to control slave controller
9 2 Slave controller: controlled by master controller, the SV value was given by master controller
SV and Rate parameter for slave controller
SV for slave controller, SV=(Rate ÷ 9999) X SV of master controller



SV for master and slave controller



SV1 1 =1000
tr1 1 =10 0
ot1 1 =100 0%

RATE=9000
SV for slave 1 is 900

RATE=8000
SV for slave 2 is 800

10 RS 485 Communication

(1) Support Modbus-RTU protocol, support 03 read command, 06 and 10 write command
(2) Communication mode: single-master Rs485 asynchronous serial communication baud rate: 2400, 4800,9600,19200(9600 baud rate is factory default value)
(3)The maximum write command for the controller is 36 at once, maximum read command is 37 at once for the read command

11 Input Ranges

Input type			Code	
K1	0 0 to 200 0 ℃		2	D2
	0 0 to 400 0 ℃		2	D4
K2	0 to 400 ℃		K	A4
	0 to 600 ℃		K	A6
	0 to 1300 ℃		K	B3
E1	0 0 to 200 0 ℃		3	D2
	0 0 to 300 0 ℃		3	D3
E2	0 to 200 ℃		E	A2
	0 to 400 ℃		E	A4
	0 to 600 ℃		E	A6
J1	0 0 to 300 0 ℃		1	D3
	0 0 to 400 0 ℃		1	D4
J2	0 to 300 ℃		J	A3
	0 to 400 ℃		J	A4
	0 to 800 ℃		J	A8
T	0 0 to 300 0 ℃		T	D3
	0 0 to 400 0 ℃		T	D4
S	* * 0 to 1600 ℃		S	B6
R	0 to 1700 ℃		R	B7
B	200 to 1800 ℃		B	B8
N	0 to 1300 ℃		N	B3
Wu3 _Re25	600 to 2000 ℃		W	B0

Input type			Code	
Pt1 (Pt100)	0.0 to 50.0 ℃		P	06
	0.0 to 100.0 ℃		P	07
	0.0 to 200.0 ℃		P	08
	-50.0 to 100.0 ℃		P	13
	-199.9 to +200.0 ℃		P	02
Pt2 (Pt100)	0 to 100 ℃		D	A1
	0 to 200 ℃		D	A2
	0 to 400 ℃		D	A4
	0 to 800 ℃		D	A8
	100 to 200 ℃		D	C2
	200 to 400 ℃		D	C4
	200 to 600 ℃		D	C6
	200 to 800 ℃		D	C8

Input type			Code	
AN1	0 to 20mV	-1999 to 9999	V	01
AN2	0 to 50mV		V	02
AN3	0 to 5VDC	-199 9to 999 9	V	03
AN3	0 to 10VDC		V	04
AN4	1 to 5VDC	-19 99to 99 99	V	08
AN4	2 to 10VDC		V	09
AN4	4 to 20mA	-1 999to 9 999	A	03
AN3	0 to 20mA		A	02
AN3	0 to 10mA		A	01

Remark: when input signal is S thermocouple, the accuracy is not guaranteed at range 0-100 celcius

1: User can select thermocouple and Pt100 using front key
2:Analog input signal has to be specified before order expect 0-20mA and 0-50mA